# Intersection Study – 169th St & Gray Rd



September 20, 2012

**Reason for Study:**

Due to an increase in traffic accidents at the intersection of Gray Road and 169th St an intersection study was performed by the Westfield Public Works Department along with input from Schneider Engineering.

Upon initial visit of the site there were several areas of concern including the following:

- Sight line distance
- Stop bar placement
- Road geometry

**Guidance:**

It has been suggested that the intersection be made a 4-way stop. The guidance on making a 2 way stop into a 4 way stop comes from the Manual of Uniform Traffic Control Devices (MUTCD). The MUTCD states the following :

- The decision to install multi-way stop control should be based on an engineering study.
- The following criteria should be considered in the engineering study for a multi-way STOP sign installation:

**A.** Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.

**B.** Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such

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crashes include right-turn and left-turn collisions as well as right-angle collisions.

**C.** Minimum volumes:

1. The vehicular volume entering the intersection from the major street approaches, Gray Rd, (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and

2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street, 169th St, approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but

3. If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.

**D.** Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

**Option:**

Other criteria that may be considered in an engineering study include:

**A.** The need to control left-turn conflicts;

**B.** The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;

**C.** Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and

**D.** An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.

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**Data collection:**

The following data was collected from the investigation:

- 12 Month Accident Totals: 10 accidents
  - 21 accidents in the last 36 months
- Gray Rd AADT: ~3600 vehicles/day
  - Average for 8hr period = 270
- 169th St AADT: ~920 vehicles/day
  - Average for 8hr period = 87
- Gray Rd Speed Limit: 40mph
  - 85% speed = 46mph
- 169th St Speed Limit (East of Gray Rd): 45mph
  - 85% speed = 45mph
- 169th St Speed Limit (West of Gray Rd): 30mph
  - 85% speed = 43mph
- Sight Line Issues:
  - Traveling EB on 169th St (Intersection Sight Distance on Gray Rd – 445') - Over a 36 month period 10% (2 out of 21) of the accidents that occurred were by north bound drivers colliding with eastbound drivers. Looking south there are several trees on the west side of the road to the south whose trunks and limbs do obscure a small portion of the road. See Figures 1&2



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Figure 1 - 169th St east bound at the stop bar looking south.

Figure 2 - 169th St east bound at the stop bar looking south (tree partially obscures car).

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- Traveling EB on 169th St (Intersection Sight Distance on Gray Rd – 445') - Over a 36 month period 10% (2 out of 21) of the accidents that occurred were by south bound drivers colliding with eastbound drivers. Looking north there are telephone poles on the west side of the road. See Figure 3


Figure 3 - 169th St east bound at the stop bar looking north.



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Figure 4 - 169th St westbound, 17' west of the stop bar, looking north.

- Traveling WB on 169th St (Intersection Sight Distance on Gray Rd – 445') - Over a 36 month period 24% (5 out of 21) of the accidents that occurred were by south bound drivers colliding with westbound drivers. Looking north, from the stop bar, the pine trees on the east side obscure the drivers view. To adequately see the 445', the driver needs to move forward 17'. See Figure 4

- Traveling WB on 169th St (Intersection Sight Distance on Gray Rd – 445') – Over a 36 month period 43% (9 out of 21) of the accidents that occurred were by north bound drivers colliding with westbound drivers. Looking south, from the stop bar, the telephone pole guy lines are in the drivers view but do not inhibit it. See Figures 5&6

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Figure 5 – 169th St west bound at the stop bar looking south.


Figure 6 – 169th St westbound, 17' west of the stop bar, looking south.

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**Results of the study:**

From the data collected a 4-way stop is warranted. All but one of the areas didn't meet the requirements - minor road volume. The most important reason for the 4-way stop is this will immediately have an impact on the accidents. In the process of gathering the accident data it was discovered that 2 of the 21 drivers involved in an accident stated that they thought the intersection was a 4-way stop. Only 2 of the accidents were there weather related conditions that may have impacted the accident. There were 2 accidents that involved low light situations. Again, we believe that sight distance played a minimum role in the accidents and that the best way to solve the problem is to install a 4-way stop. However, there are some areas that could be improved first to see if this helps the problem. They include the following:

- Remove all trees that impede sight distance. This would include the tree and bushes on the south east side of Gray Rd and the trees along the north east side
- Improve the radius at the SE corner of 169th St and Gray Rd. This would include relocating the utility pole at the southeast corner. This would allow the placement of the stop bar to be closer to the intersection while allowing north bound traffic to make an unimpeded right hand turn.

There is enough data supporting any decision to improve the safety of the intersection, especially the number of accident in the last twelve months.



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It is therefore the recommendation of the Westfield Public Works Engineering Division that the least expensive and most impactful method would be the installation of additional stop signs both north bound and southbound on Gray Rd. Moreover, there are similar roads with similar speeds and volumes within the city that have 4-way stops. These would include: 161st St and Carey Rd, 161st St and Oakridge Rd, and 156th St and Springmill Rd.

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